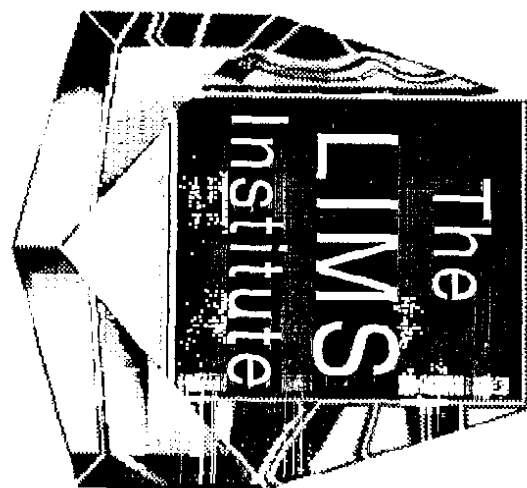


The LIMS Summer School  
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## THE LIMS SUMMER SCHOOL

Westin William Penn Hotel  
Pittsburgh, Pennsylvania

June 10-12, 1997

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The LIMS Summer School, sponsored by the LIMS Institute, will be held June 10-12, 1997, at the Westin William Penn hotel, Pittsburgh, PA., to provide LIMS newcomers, professionals, and users with a unique opportunity to advance their professional knowledge and skills.

Eleven courses will be offered, taught by a who's who of LIMS industry experts. The classes will address a range of needs, from introductory level to advanced techniques. Topics covered run the gamut, from LIMS selection to validation to client/server architectures. Take a look through the list of courses -- there's sure to be one that meets your needs!

## TWO DAY COURSES, TUITION \$800

Buying A LIMS: A Systematic Approach, *Gerst A. Gibbon and Joseph H. Golden*

LIMS Strategy and Tactics, *Robert D. McDowall*

Electronic Lab Notebooks and R&D Team Computing Systems, *Rich Lysakowski and Jim Currie*

## ONE DAY COURSES, TUITION \$400

LIMS Configuration-The Modern Approach, *Andy Parker*

LIMS Validation Issues, *Peter and Mary Ann Berthrong*

LIMS Advanced Topic, *Jo S. Webber*

LIMS: A Look Under the Hood, *Robert Megargle*

LIMS and Lab Automation, *Reinhold Schaefer*

Laboratory Reengineering and Workflow Analysis, *Randy Collins*

## HALF DAY COURSES, TUITION \$200

An Overview of the ASTM LIMS Guide and Its Use as a Laboratory Tool, *Steve O'Connor*

LIMS and ISO-9000, *Helen Gillespie*

## Buying A LIMS: A Systematic Approach

Instructors: Gerst A. Gibbon and Joseph H. Golden

LIMS have proven to be powerful and effective tools for improved management of laboratory data and operations. They collect, process, and present timely and accurate information that satisfies the needs of the customer, makes possible the effective scheduling of work and allocation of resources, and facilitates the satisfaction of quality management, accreditation, validation and regulatory compliance requirements.

LIMS are computer-based, transaction-oriented, database management systems that extend at their front end to instrument interfacing, data acquisition, and test automation, and at their back end to report generators, scientific data visualization systems, process control systems, MRP II systems, and interfaces with other enterprise information systems.

Successful acquisition of a LIMS entails an exercise in systems analysis and life-cycle systems engineering. This process is qualitatively different than the acquisition of laboratory instrumentation. It is a process in which mistakes not only waste time and money but can result in systems that are counterproductive to their objectives. Even projects that are ultimately successful often take longer and cost more than originally anticipated.

This course is intended for corporate and institutional decision makers and technical staff who must manage, select, budget, justify or approve the acquisition of a LIMS. This course is a must for those faced with acquisition of their first LIMS whether it is a first for their organization, or the replacement of a legacy system.

A time tested methodology for acquiring a LIMS that truly delivers the benefits being sought is offered. It starts with the basic question 'where are we starting from?' and covers the following topics:

- Assessing Needs and Setting Priorities
- A Comprehensive Look at LIMS Functions
- Functional Requirements Analysis and Specification
- Hardware and Software Implementation Approaches
- Approaches to Acquisition
- The Request for Proposals and Vendor Selection
- Budgeting and Cost Justification

Gerst A. Gibbon is a Physical Scientist in the Process Engineering Division of the Office of Engineering and Systems Analysis of the Federal Energy Technology Center of the U. S. Department of Energy. Dr. Gibbon has been active in laboratory automation and computerization for 20 years. In particular, he has been a leading innovator in the design and implementation of Laboratory Information Management Systems (LIMS). He has given numerous presentations on such systems and organized several symposia on the topic. Dr. Gibbon served as general chairman of the First International LIMS Conference and is President of the LIMS Institute, Inc., which is the umbrella organization for the annual International LIMS Conferences.

Joseph H. Golden has been involved in LIMS development for over fifteen years and has over thirty years overall experience in computer-based and electronic systems development, project management, and systems engineering for industrial, institutional, government, and defense applications. He brings to the course the disciplines of an Electronic Systems Engineer and the perspective of a bottom-line-conscious businessman. His published works on LIMS have appeared in ACS publications, in American Laboratory, and in Instruments and Computers. His views on the use of LIMS as a laboratory management tool have been quoted in editorial articles in Chemical and Engineering News, Clinical Chemistry News, and Industrial Chemist.

**Instructor: Robert D. McDowall**

The course will consist of a mixture of lectures, workshops and open discussions. Participants are expected to contribute their experiences and problems to the course for discussion. The course will include the following:

- \* Overall strategy for a LIMS using the LIMS matrix. Prioritisation of functions and phasing of the project
- \* LIMS model
- \* Linking instrumentation to the LIMS: advantages and disadvantages of the options
- \* User Requirements Specification
- \* Risk assessment of a LIMS project through the life cycle
- \* Validation of a LIMS: life cycle approach and documentation required
- \* Implementation and the Involvement of Users

Principles of the course will be re-inforced by workshops using a case history based on the analytical laboratory of Grabbe, Money and Runne, a well known organisation.

Bob McDowall is an analytical chemist with over 25 years experience and 15 years experience with LIMS. He has worked for 15 years in the pharmaceutical industry. For the past four years Bob has been the Principal of McDowall Consulting.

Achievements include:

- \* Editor of the first book on LIMS.
- \* Author or co-author of approximately 40 papers and book chapters on LIMS, including two key LIMS papers published in the A pages of Analytical Chemistry and a three-part series in LC-GC and LC-GC International.
- \* Over 80 oral presentations on LIMS from 1986-1996 to international and national conferences and undergraduate courses.
- \* Editor of Laboratory Automation and Information Management, Editorial Advisor Board member of LC-GC and LC-GC International and the Journal of Pharmaceutical and Biomedical Analysis.
- \* Presented more than 20 workshops on LIMS at international scientific meetings, including the Pittsburgh Conference and the International LIMS Conferences.
- \* Course Leader of the Practical Computer Validation Course for the Royal Pharmaceutical Society of Great Britain.

## **Electronic Lab Notebooks and R&D Team Computing Systems**

**Instructors: Rich Lysakowski and Jim Currie**

### **Who Should Attend**

Scientists, managers, engineers, MIS and computer support, patent attorneys and industry regulators in the chemical, pharmaceutical, environmental, biotech, food and beverage, and related industries, universities or government labs. This course will be of interest to anyone needing to know the legal, regulatory, technical and social aspects of electronic notebooks, recordkeeping, document management or other collaborative systems used in R&D or testing labs.

### **Key Topics You will Learn About**

- \* What are 'electronic lab notebooks' and 'R&D team computing systems'?
- \* Bottom-line business benefits and costs of systems and applications
- \* 'Best practices' for R&D and testing laboratory recordkeeping
- \* The 13 fundamental properties of electronic records management systems and organizations
- \* Electronic signature and notary systems and products available
- \* Satisfying the latest Patent Office, FDA, and EPA recordkeeping requirements with electronic records and signatures
- \* Basic &; advanced technical system requirements
- \* Design and usability features that 'make or break' your projects
- \* How to move through potential cultural barriers to electronic notebooks and other electronic collaboration systems
- \* Case studies and end-user experiences with home-brew and commercial systems
- \* How to critically evaluate vendors and commercial products for fit
- \* A sampling of tools, technologies, and approaches for building systems

### **How You Will Benefit from This Course**

- \* Stay current with latest technologies, regulations and legal imperatives for laboratory recordkeeping
- \* Lead your company into the electronic recordkeeping age by understanding critical requirements
- \* Quickly assess your company's infrastructure and cultural readiness to use electronic lab notebooks; learn to prepare them if they are not
- \* Enroll your Legal and Regulatory Affairs Departments as partners rather than adversaries
- \* Learn when to buy versus build electronic notebook systems; how to grow them into full-blown R&D team computing systems
- \* Get practical tips for evaluating and selecting vendors and systems
- \* See key products evaluated and demonstrated without vendor hype
- \* Receive references to deepen your understanding of concepts and systems in this course

Rich Lysakowski has more than 17 years experience in analytical and physical chemistry and lab automation engineering using LIMS, groupware document, and records management systems. TeamScience, Inc. specializes in research, software engineering, training, consulting, and industry reporting on R&D and lab automation systems and methodologies. He is the Executive Director of the Electronic Notebook Research Institute, the Collaborative Computing Institute, and the Collaborative Electronic Notebook Systems (CENS) Consortium.

Jim Currie is a lab automation expert, LIMS trainer, and project engineer. Using his expertise as an analytical chemist and lab automation engineer, he actively develops lab software, interfacing standards, and project methodologies. He has spent the past 17 years teaching, working in industry, and assisting corporations and government agencies with strategic and tactical lab automation projects. He is also Technical Director of the Collaborative Electronic Notebook Systems (CENS) Consortium.

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Instructors: Peter G. Berthrong and Mary Ann G. Berthrong

This course will focus on the relationship of LIMS to the issue of system validation. This issue is not only of interest to those users in regulated industries such as pharmaceuticals or environmental laboratories, but also to an increasing number of laboratories in all industries attempting to conform with international regulations, such as ISO 9000, the increasingly regulated local environment, as well as competitive pressures.

This course will briefly offer an overview of the History of Validation and perhaps insight into the origins of some of the terminology and practices.

A review will be given of the relevant regulations such as Current Good Manufacturing Practices (GCMF), Good Laboratory Practices (GLP) as well as the ISO 9000 series of requirements. The course will also review the industry and other reactions to those initiatives such as ISO registration, the TickIT plan for compliance and the Good Automated Manufacturing Practice (GAMP) set of practices.

This course will examine the various steps that must be taken to assure a proper validation at the end, concentrating on the various life-cycles. Practices will be laid out for those sites that wish to validate a commercial LIMS in their own environment and also for those who will develop their own LIMS and must face the prospect of the system validation as well.

Validation should not be thought of as a unique problem to the regulated industry. An example will be given of how the concept of validation fits with what might commonly be called good engineering practices in a number of industries simply to prove that a system does what the original contract specified. Validation not only makes sense but is good business practice.

Peter G. Berthrong has over 30 years of active involvement in the computerized laboratory environment, including over 20 years in computer validation. He has been involved in the pharmaceutical industry since 1966 and has also encompassed other regulated industries, such as petrochemical and environmental, since 1984. Peter Berthrong has published several technical articles in the field of LIMS and has lectured at a number of professional forums worldwide.

Mary Ann G. Berthrong has spent over 30 years in the pharmaceutical industry dealing with quality and regulatory issues in North America and Europe, including validation of LIMS, analytical methods and manufacturing processes.

### **LIMS: A Look Under the Hood**

Instructor: Robert Megargle

We all become better users of our instruments and scientific equipment when we understand the basics of the processes taking place inside the cover. Without that understanding, we are mere button pushers at the mercy of our machines. With knowledge comes the ability to better understand the limitations and advantages of our equipment, recognize problems and make effective corrections, and take advantage of our equipment's full power. We perform our jobs with more confidence and stature, and command respect and authority as the experts we actually have become. This one-day short course examines the hardware and software technology used in a typical LIMS.

The hardware component will deal with the memory and central processor, input/output mechanisms, monitor screens and keyboards, tape and disk drives,

bar code readers, serial and parallel communication, and instrument interfaces. The software unit will explain operating systems and computer languages. It then will consider various software strategies like linked lists, binary trees, and B-trees. The course will end with a discussion of databases and how a typical LIMS is implemented from these software tools.

Robert Megargle is an Analytical Chemist with 35 years experience applying electronics and computers to laboratory applications. He has designed and constructed numerous chemical instruments, including many with instrument-computer interfaces. He was involved in early efforts to implement laboratory computer networks, built robotic systems for laboratories, and worked on several LIMS projects. He taught classes at Cleveland State University in 'Electronics for Chemical Instruments' and 'Computer Information Systems', the latter applied to both clinical and industrial laboratories. He is a co-founder of the ASTM subcommittee E-49.07 on LIMS. He has given many workshops at regional and national meetings on LIMS, and was the recipient of the International LIMS Award in 1996.

### **LIMS Configuration - The Modern Approach**

Instructor: Andy Parker

System configuration is the process of converting a 'standard LIMS into one suitable for a specific application without the need for programming skills.

Easy and fast system configuration can provide benefits such as:

1. fast implementation which helps the cost justification case and the return on investment calculations
2. quick changes to address the 'moving goalpost situations
3. less dependence on the vendor
4. lower system cost

This workshop will illustrate the power of modern configuration tools which can contribute enormously to a LIMS project. The areas to be covered are as follows:

#### **1. Screen Design**

Several different types of sample registration screen, for example, may be needed to suit different sample types such as raw materials, in process samples, finished products, competitive products, complaint samples and even laboratory standards.

Examples of these screens will be shown. Modification of screens will be discussed - re-sizing, moving buttons/fields, adding buttons/fields, changing text and adding links to third-party software.

Screen filters will be explained and demonstrated. For instance, in a raw material registration screen, a filter is needed to ensure that only raw materials are listed when the product table is accessed.

#### **2. Menu Building**

Menu building will be discussed including the impact of full translation and terminology changes. The ability to create multi-level menus and how each item on a menu triggers a function and/or a screen appearance will be shown. Links to authority access will be explained.

#### **3. Terminology Changes and Translation**

A system translation facility will be shown that allows conversion of all terminology using a simple A = B user interface. This allows simple changes of

## COURSE SCHEDULE

Tuesday June 10		Wednesday June 11		Thursday June 12	
AM	PM	AM	PM	AM	PM
Buying a LIMS: A Systematic Approach				LIMS Validation Issues	
LIMS Strategy and Tactics				ISO 9000 and the Laboratory	An Overview of the ASTM LIMS Guide
Electronic Lab Notebooks and R & D Team Computing Systems				LIMS: A Look Under the Hood	
Laboratory Reengineering and Workflow Analysis		LIMS Validation Issues		Advanced LIMS Topics	
		LIMS Configuration- The Modern Approach		LIMS and Lab Automation	

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... changes may be applied throughout the system or for specific databases, specific screens, buttons and/or fields.

#### 4. Test Type Definition and Test Screen Presentation

The definition of various test types will be shown. These will include numeric, text, menu, sample field, cross test and other calculations. The building of screens to incorporate one or more of these test types will be shown together with the method of identifying result cells for the purpose of data import or their use in calculations.

#### 5. Other Areas of Configuration

If time allows further configuration issues will be discussed as follows:

- use of sample, test and product limits
- system security
- the creation of list boxes
- instrument connections

If the conclusion of the presentation the key question will be 'Why configuration? Hopefully, it will be obvious how quick and easy LIMS tailoring can be and hence how costs can be dramatically reduced.

Andy Parker has worked with laboratory computer systems for the past 16 years. He started from the end-users perspective as an analytical chemist at whatever, with a keen interest in computing. This involved the task of LIMS implementation. During the last 8 years, he has concentrated solely on the computing aspects of laboratory management. This began with a period at Ackman as Project Manager, where he was involved with the installation and support of VAX based LIMS in Europe.

For the past 7 years Andy has worked for GP Software where he has been involved in the implementation of various LIMS and instrument interface systems. Over the past 3 years Andy has led the software team responsible for the development of the Autoscribe Matrix LIMS product.

#### LIMS and Lab Automation

Instructor: Reinhold Schaefer

Who should attend the course:

This short course is designed for people from all types of industries who intend to install LIMS with on-line connected instruments in their laboratories in the near future or have just installed one. Special attention is given to convincing corporate-wide integrated solutions. Decision makers as well as technically oriented people will find a lot of detailed information in this course.

Content of the course:

The course starts with terms and definitions of automation in the laboratory. In four main blocks follow Block 1 covers the design of information systems in the laboratory. The role of LIMS systems and lab automation systems are discussed in depth. This part also includes how manual operations could be streamlined going into a layered systems hierarchy. In Block 2 structural topics will be taught. Special topics will include hierarchies vs. work structures, client/server vs. distributed system architecture, instrument coupling to a LIMS via different technologies, and deterministic vs. deterministic communication. Work flow management related topics are listed in Block 3. The area of master data management, including analytical procedures and SOPs, the identification problem, sequencing of samples, data

documentation of data, are the main areas to be discussed here. Integration into a corporate-wide infrastructure and its work flow impact will be covered also. Finally, Block 4 gives an overview into future aspects; e.g., intelligent instruments, robotics supported sample preparation, chemical detectors, automated scheduling of samples using AI (Artificial Intelligence) methods, expert systems utilization, etc.

In the short course, several small case studies will be explained. Attendees will have the opportunity to address their own automation problems and discuss them briefly with the instructor.

Dr. Reinhold Schaefer received his Diploma in Physics at the University of Mainz/Germany in 1972, and a doctorate at the University of Mainz, Institute for Biophysics, in 1979. From 1973 to 1988, he worked in several positions in the pharmaceutical industry automating Research and Development experiments and complex work flows. He is now Professor for Database Systems and Methods of Artificial Intelligence at the Fachhochschule Wiesbaden, Germany.

His research interests include computer integration of a fully automated analytical laboratory ('Wiesbaden Computer Integrated Laboratory (WICIL)'). He and his group developed expert systems for dynamic scheduling and automated decision support, a high level language with graphical input of sample preparation and analyses, simulation and animation of a generic chemical workbench including any kind of co-operation between robots and instruments. He also designed and implemented a multi-lingual LIMS with stability analyses management for a multi-national pharmaceutical company, and a software package to support the generation, translation, and distribution of analytical procedures. Additional research interests include data warehousing and on-line analytical processing (OLAP) with data mining, monitoring for research and development projects, quality information management, and packaging material film generation. He is also an industry consultant for automation projects and software engineering.

Dr. Schaefer serves as a member of the editorial board of Laboratory Automation and Information Management. He also is member of the committees of the LabAutomation and International LIMS Conferences, and will be Chairman of the International LIMS Conference in 1999.

#### An Overview of the ASTM LIMS Guide and its Use as a Laboratory Tool

Instructor: Steve O'Connor

This half day course will examine the current ASTM LIMS standard, E-1578 'Standard Guide for LIMS', and its usage as a tool in defining laboratory requirements. Topics examined include the LIMS Life Cycle, LIMS concept model, and usage of the LIMS functional checklist. In addition to the current LIMS standard, a brief review of the draft LIMS Validation Guide will be included in this course.

Steve O'Connor first started his LIMS career in late 1984 on an in-house written application. He was involved in the 1987 grass roots effort in establishing a LIMS ASTM subcommittee. He started his ASTM activities as the Recording Secretary to the E-31.40 LIMS subcommittee. He later was nominated to the E-31.40 LIMS subcommittee chairman position, which he still holds today. The subcommittee's efforts led to the publishing of the industry's first LIMS Guide, E-1578, in 1993. Since that time his efforts for the now E-49.07 LIMS subcommittee have been focused on the development of a LIMS Validation Guide.

Steve has presented several papers at the annual International LIMS Conferences as well as the Scientific Computing Conferences. During Steve's career as the LIMS Manager for the Health Care Product Development Division at Procter & Gamble, he has been involved in the purchase and implementation of two separate LIMS applications since 1991.

#### **ISO 9000 and the Laboratory**

Instructor: Helen Gillespie

This is an introductory course on how to implement ISO 9000 in the laboratory, with attention paid to the issues that must be addressed concerning the LIMS. The course will assist anyone involved in the implementation or maintenance of an ISO 9000 quality management system. The 20 elements of ISO 9000 will be covered, with a particular focus on how to document to the standard; how to select a registrar; and how to survive a third-party audit.

Although the common catch-phrase to ISO 9000 implementation success is 'write down what you do, do it, and document what you've done,' this rarely happens. Instead, once written down, organizations use ISO 9000 as a means to revise outdated practices, streamline processes, and reengineer c...ments. This course is designed to prepare participants for these events and provide the tools and knowledge necessary for ISO 9000 certification success. How the standard applies to LIMS and software quality issues, such as TickIT and ISO 9000-3, will also be discussed.

Participants will be provided with a copy of the ISO/QS 9000 standard and selected background materials, as well as a hardcopy and electronic template for developing a Quality Policy Manual.

Helen Gillespie is a freelance writer and industry analyst who specializes in high technology. In June 1995, she launched a quarterly newsletter for LIMS professionals entitled the LIMS/Letter. In June 1996, the LIMS/Letter which comprises some 400 pages of LIMS news and events, including book reviews, product/service listings, and more.

She is a contributing editor for Today's Chemist and Scientific Computing & Automation. Recent articles include 'Food Technologists Gird to Face Challenges from Within and Without' (February 1997); 'When LIMS Link with Intranets, Can the Virtual Laboratory be Far Behind?' (November 1996); 'ISO 14000, the New Environmental Standard Sparks Controversy' (November 1995). Her pieces have also appeared in several trade publications such as PI Quality, Quality Progress, LC/GC, Pharmaceutical Technology, R&D, Environmental Lab, American Laboratory, and International Laboratory. Her articles range from case studies to features about spectroscopy, chromatography, and laboratory information management systems (LIMS) as well as quality system management issues and validation requirements.

Her high technology experience ranges from analytical chemistry to data communications to software and semiconductors. She has assisted Varian, DisCopyLabs, Clontech Laboratories, Cirrus Logic, Paradigm, and Symantec with their ISO 9000 quality manuals and has been trained as a Lead Assessor.

#### **Advanced LIMS Topics**

Instructor: Jo S. Webber

The advanced topics course will cover the areas of integration of the LIMS application within the overall business environment. The impact of Enterprise Resource Planning (ERP) systems and, in particular, the massive market acceptance of SAP R/3 will be discussed. The points of integration between a LIMS and an ERP system will be discussed. The connection of a LIMS solution with SAP R/3 will be addressed in detail.

The course will cover the creation and management of COA's (Certificates Analysis), and how the LIMS interacts with the shipping function. The connection and operation of LIMS solutions with an ERP system as part of an enterprise solution will be detailed and working examples given.

The course will also look at the use of desktop tools (for example, the Microsoft Office suite) with LIMS data, and also provide an overview of current Internet technology and how it impacts LIMS. The topic of compound document management will be addressed. On-line SOP's and the display and management of graphical raw data files within reports will be discussed.

Jo S. Webber earned a first class honours degree in Applied Chemistry and Ph.D. in Quantum Mechanics from Nottingham University in England. While doing the PhD, she installed a LIMS system at the University, which led to being hired by VG Instruments.

Jo installed LIMS systems for VG Instruments from 1988 - 1990 in Europe and the US. Then in 1990, after VG Instruments was acquired by Fisons, she moved to the US to look after customer services for Fisons in the US. She joined LabWare in 1995 as Research Director.

#### **Laboratory Reengineering and Workflow Analysis**

Instructor: Randy Collins

Who Should Attend:

This one-day course is designed for laboratory and/or information system professionals who are facing the task of Reengineering, or improving, the current laboratory environment. Whether they are replacing an existing LIMS or not, individuals and/or groups who are not comfortable with the scope and expected deliverables of the Reengineering effort will find this course extremely useful. This course presents a more integrated, implementation-focused approach, starting from initial study of laboratory operations and concluding with implementation of systems, services, organizational redesign, and/or training. The attendee will see how goals and objectives of Reengineering activities are tied to implementation in the laboratory.

Course Topics:

The course will address the following Reengineering and related topics:

- Definitions, methodologies, and reference materials
- Related subjects, like Continuous Process Improvement, Total Quality Management, etc.
- The laboratory business modeling techniques, like Workflow Analysis, used in Reengineering efforts
- Implementation of the results of Reengineering studies
- Project Management and Control aspects of Reengineering
- Project Planning, Justification, and Requirements definition for Reengineering efforts
- Workflow analysis, and its extensions, as an aid to Reengineering project efforts
- Capturing shareable, workflow information from Reengineering, using Activity Characterization Tables
- Software Tools that aid Reengineering efforts
- Linking Reengineering efforts to implementation-related data modeling and/or mapping activities

Randy Collins is a Laboratory Automation Consultant at the Consulting Expertise Center, Inc. in Chicago, Illinois. Randy is both an MRA and an

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Electrical Engineer, who has honed his skills as a LIMS Consultant by working extensively in the field for the past fifteen years. He has worked with hundreds of clients during that time, and is a veteran of numerous LIMS projects, including all phases from study to implementation/rollout. Randy is considered one of the top experts in the world on the Investment Justification of LIMS and Laboratory Automation projects. He was one of the first laboratory automation consultants to modify and apply Workflow Analysis to the laboratory environment for the purpose of streamlining laboratory operations and LIMS implementation. Randy is a familiar face and frequent contributor at the International LIMS Conference, the Pittsburgh Conference, and to Scientific Computing & Automation magazine. His course will change the way you think of LIMS, and will likely set the standard for how laboratory projects are planned and implemented in the future.

## REGISTRATION FORM

Buying a LIMS: A Systematic Approach	\$800.00	\$ _____
LIMS Strategy and Tactics	\$800.00	\$ _____
Electronic Lab Notebooks and R&D Team Computing Systems	\$800.00	\$ _____
LIMS Validation Issues	\$400.00	\$ _____
LIMS: A Look Under the Hood	\$400.00	\$ _____
LIMS Configuration-The Modern Approach	\$400.00	\$ _____
LIMS and Lab Automation	\$400.00	\$ _____
An Overview of the ASTM LIMS Guide and its Use as a Laboratory Tool	\$200.00	\$ _____
ISO 9000 and the Laboratory	\$200.00	\$ _____
Advanced LIMS Topics	\$400.00	\$ _____
Laboratory Reengineering and Workflow Analysis	\$400.00	\$ _____
Total		\$ _____

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 E-Mail: \_\_\_\_\_

Method of Payment:

\_\_\_\_\_ Check/Money Order (Enclosed)

Credit Card: \_\_\_\_\_ VISA or \_\_\_\_\_ Master Card

Card Number: \_\_\_\_\_

Name on Card: \_\_\_\_\_

Date of expiration: \_\_\_\_\_

The LIMS Institute reserves the right to cancel any course due to a lack of enrollment or the unavailability of an instructor.

Complete and mail or Fax this form to

The LIMS Summer School  
 P.O. Box 85  
 Springdale, PA 15144

Fax: 412-274-4340

You may also use the electronic registration form found at [www.limsources.com](http://www.limsources.com)

## HOTEL INFORMATION

To make hotel reservations call the Westin William Penn at (412)-553-5100. The group identification is The LIMS Summer School, and the rate is \$117.00 single or double. The cut off date for the Summer School rate is May 12, 1997.

The Westin William Penn hotel is served by Airlines Transportation Company with regularly scheduled limousine service. Tickets may be purchased at the company desk in the baggage claim area of the Pittsburgh Airport.

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